



The evaluation board provides connectivity to all the integrated devices on the PIC. It allows customers to deliver 16 x 32Gbaud data lanes from coherent digital signal processors (cDSP) which map to 4 dual-polarization IQ modulated wavelengths.

A controller board is also available to deliver voltage and current bias control to the PIC, and to allow control via integrated single board computer and graphical user interface (see the SuperTROSA Demonstrator overleaf)

Typical Specifications

Superchannel Data Rate	Up to 1.2Tbps
Number of channels	4
Wavelength Spacing	34 – 38 GHz
Modulation Rate	4 ch x 32 Gbaud 3 ch x 64 Gbaud
Wavelength	1550 nm (C-band tunable in 2024)
Transmission Distance	150 km
Superchannel Output Power	-6 dBm
Polarization Extinction Ratio	20 dB

SuperTROSA

Comb-based Superchannel Transmitter

Pilot Photonics' TERA-4-TX is a transmit side optical engine for next-generation coherent superchannel transceivers. Designed to be used in high-capacity, high-spectral efficiency systems, the TERA-PIC-TX is based on a monolithic indium phosphide photonic integrated circuit (PIC). It combines a wavelength tunable, integrated comb source and demux that supplies four simultaneously generated coherent wavelengths to an array of dual-polarization IQ modulators. The outputs of these modulators are combined to produce the coherent superchannel. A polarization-maintaining fiber array output with LC/APC connectors delivers the superchannel to the mux or pre-amp for transmission. Individual sub-channel outputs can also be provided.

Features

- 4 coherent wavelengths & data channels from a single device
- Up to 64 Gbaud Dual polarization IQ modulators
- Up to 64QAM capable
- Transmission distances of 150km+
- Superchannel data rate up to 1.2 Tb/s
- Sliceable superchannel outputs (1 channel, 2 channels, 4 channels)
- Lower cost and power than individual transceivers
- Reduced footprint and faceplate density
- Eliminate intra-channel guard bands
- Simplifies channel monitoring and control
- Enables enhanced nonlinear compensation
- Simplifies network management

Applications

- Terabit coherent superchannel transceivers
- Long-haul and sub-sea networks
- Datacentre Interconnect



SuperTROSA

Comb-based Superchannel Transmitter

Optical Specifications	Min.	Typ.	Max.	Unit	Notes
Transmitter Output Stage (Tx)					
Superchannel Data Rate		1.2		Tb/s	Net Rate Assuming 32Gbaud, 64QAM
Transmission Distance		150		km	Further reach with reduced QAM
Superchannel Bandwidth		150		GHz	
Superchannel Output Power		-6		dBm	
Spectral Efficiency		10		b/s/Hz	Assumes 64QAM
Polarization Extinction Ratio		20		dB	
Comb Source Stage					
Comb Bandwidth		112.5		GHz	3dB Bandwidth, 4 ch spaced by 37.5 GHz
Comb Spacing	18.75		37.5	GHz	Selectable through RF drive frequency
Linewidth		<700		kHz	
Wavelength Range	1530	1550	1560	nm	C-band DWDM Tunable in 2024
Demultiplexer Stage					
Channel Count		4			
Channel Spacing		37.5		GHz	
Adjacent Channel Rejection		>35		dB	
Modulator Stage					
Structure		DP-IQ			Dual Polarization, IQ modulation
Modulator Bandwidth		>25	50	GHz	32Gbaud, 64 Gbaud Capable
Modulation Order			64-QAM		32QAM, 16QAM, 8QAM, QPSK
Modulator Drive Voltage		4.5		Vpp	
Physical Specifications					
PIC Dimensions		12 x 8		mm	
Chip Temperature	15	20	40	°C	
Case Temperature	10	25	45	°C	
Storage Temperature	-40		60	°C	Non-operational
RF Input Count		16			4 wavelengths, 2 polarizations, I & Q
Fiber Array Connector		LC/APC			8/16 fiber array Corning PANDA PM Slow axis aligned

